

Control Number 10/712,949 (filed 11/13/2003)

Art Unit: 1764

REMARKS

Applicants respectfully request Examiner Nguyen to admit this Amendment to place subject Application in condition for allowance and/or present rejected claims in better form for consideration on appeal. In particular, Claim 21 has been amended to
5 be commensurate with the working examples in the specification, more particularly point out and distinctly claim the subject matter which applicants regard as the invention, and to comply with requirements under 35 U.S.C. § 112.

Claim 21 has been amended to recite:

10 reacting a petroleum distillate consisting essentially of material boiling between about 50° C. and about 425° C. comprising a mixture of sulfur-containing, nitrogen-containing and other organic compounds derived from natural petroleum with a source of hydrogen at hydrogenation conditions in the presence of a hydrogenation catalyst to assist by hydrogenation removal of sulfur and/or nitrogen from hydrotreated distillate;

15 partitioning by distillation the hydrotreated distillate to provide at least one low-boiling organic part consisting of a sulfur-lean, mono-aromatic-rich fraction, collected below a temperature in the range from 260° C. to 300° C., comprising a mixture of sulfur-containing, nitrogen-containing and other organic compounds derived from natural petroleum and a high-boiling organic part consisting of a
20 sulfur-rich, mono-aromatic-lean fraction; . . .

Support for these amendments is found in the Specification, for example at page 38, line 21 to page 39, line 22.

Claim Rejections - 35 U.S.C. § 112

25 In outstanding Office Action, Claims 21 to 28 were rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Examiner Nguyen avers that the specification does not have support for "mono aromatic-rich fraction having a sulfur level of no more than 25 ppm" (ranging 0-25 ppm). Applicants respectfully traverse this rejection.

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Claims 21 to 28, all claims now presented, recite "mono-aromatic-rich fraction, collected below a temperature in the range from 260° C. to 300° C.", and the term "having a sulfur level of no more than 25 ppm" has been deleted.

Applicant respectfully requests Examiner Nguyen to withdraw his 112
5 rejections, and pass subject application for allowance.

Claim Rejections - 35 U.S.C. § 103(a)

In outstanding Office Action, Claims 21 to 28 were rejected under 35 U.S.C. §
103(a) as being unpatentable over Brownawell et al. (EP-0 252 606) in view of Schultz
et al. (US 2,365,220) and Farkas et al. (US 2,472,152). Applicants respectfully
10 traverse these rejections.

The Brownawell et al. reference of record describes a process said to increase
the cetane number of a middle distillate fuel fraction by using one or more non-oxide
catalytic metals to selectively oxidize benzylic carbon atoms present in the fuel to
ketones. Preferably, Brownawell et al. states, the non-oxide catalyst will be one or
15 more oil or water soluble compounds. On the other hand, the non-oxide catalytic
metal compound may be insoluble in both oil and water. In non-preferred cases, the
insoluble, non-oxide catalytic metal compound may be in a bulk form or supported on
a suitable support material (page 5, lines 27 to 32). The Brownawell et al. reference of
record does not define or illustrate the meaning of the term "suitable support material."
20 All of the working examples in the reference of record use oil soluble metal salts;
copper sulfate pentahydrate in Examples 1 to 3, and cobalt naphthenate (6% Co)
catalyst solution in Examples 4 to 6.

In contrast, instant claims recite as critical elements of Applicants'
novel process the use of a liquid reaction medium containing a
25 **particulate, heterogeneous oxygenation catalyst system** which comprises
one or more catalyst metal selected from the group consisting of chromium,
molybdenum, bismuth, manganese, iron and platinum. Claim 21 now
recites recovery of a low-boiling oxygenated product having a low content
of nitrogen, acidic co-products and a sulfur content of no more than 15

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ppm. Analyses of Applicants' organic liquid of low density determined sulfur contents below 10 ppm, and even as low as 6 ppm (see Example 7).

5 The process described in the EP reference is different in kind, not merely degree, from Applicants; novel process. As noted by Examiner, example 1 in the Brownawell et al. reference of record shows that sulfur content is decreased from 0.74 weight percent to 0.42 weight percent (4,200 ppm). By contrast instant claims are directed to a product with a sulfur content of no more than 15 ppm.

10 Examiner avers also that example 3 (Brownawell et al.) shows that after an oxidizing step, sulfur is reduced from 1ppm to zero. Contrary to the position of Examiner, Applicants believe one skilled in the relevant art would understand that the report of "<1 ppm" (less than 1 ppm) sulfur is a statement that the sulfur level was substantially zero in unoxidized heavy hydrocrackate. The fact that no analysis of the
15 oxidized heavy hydrocrackate for sulfur is reported is a confirmation that example 3 does not show a reduction in sulfur.

Schultz et al. suggests need for neutralizing acids in hydrocarbon effluent from non-catalytic oxidation, but does not disclose or suggest a presence of any sulfur or nitrogen containing compounds.

20 Farkas et al. is directed to preparation of high cetane number Diesel engine fuel by adding organic peroxides and/or organic hydroperoxides thereto. The Farkas et al. reference describes neutralizing acids in hydrocarbon effluent from non-catalytic oxidation, but does not disclose or suggest a presence of any sulfur or nitrogen containing compounds.

25 The Schultz et al. and/or Farkas et al. references in combination with the EP reference do not disclose or suggest the results of Applicants' process.

Base on the amendments submitted above and earlier, Applicants urge that Claims 21 to 28 inclusive, all claims now presented, are in condition for allowance. Applicant respectfully requests Examiner Nguyen to pass subject application for
30 allowance.

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Do not hesitate to contact Frederick S. Jerome whose telephone number is (630) 832-7974 (FAX (630) 832-7976) if additional assistance is needed regarding this paper or earlier papers for Applicants.

Applicants and their undersigned Attorney appreciate Examiner's attention and
5 consideration of this matter.

Respectfully submitted,



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